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Appn. No. 09/621,249 Filed: July 21, 2000  
Applicants: Allen D. Hertz, et al. Examiner/GAU:Frankie L. Stinson/ 1746  
Title: **METHOD AND APPARATUS FOR ACOUSTIC AND  
VIBRATIONAL ENERGY FOR ASSISTED DRYING OF SOLDER  
STENCILS AND ELECTRONIC MODULES**

Date: June 02, 2003

### **Inventor's Affidavit - Development Timeline**


I hereby attest that I, **Allen Hertz**, Applicant in said invention believe that the following timeline is true to the best of my knowledge and supporting documentation:


- Date of Conception for using ultrasonic energy for enhanced soldering: November 08, 1997 (See Page 4 of the disclosure statement – Exhibit A)
- Application of ultrasonic / vibrational energy for increased solderability.
- Experiments completed prior to January 13, 1998 at Racal Datacom in Sunrise, FL using an ultrasonic horn taught that the ultrasonic horn introduces energy into the process that removes oxides (cleaning process) and causes heat which can be used for drying. (Data Sheet faxed to Heller Industries – Exhibit B)
- Discussion of concepts with EMC under NDA (Proprietary Inventors Agreement dated Feb. 10, 1998 – Exhibit C)
- Discussion of concepts with MPM under NDA (Proprietary Inventors Agreement dated March 04, 1998 – Exhibit D)
- Further understanding of the cleaning and drying abilities when applying vibrational energy for cleaning and drying electronics: Using the vibrational energy to atomize the residual fluid: July, 1998
- Realization during the efforts on the ultrasonic energy for enhanced soldering reduction to practice. The first reduction to practice was when Eric Hertz held an ultrasonic gun (borrowed from Branson Ultrasonics) against a Styrofoam cup filled with water. This procedure was invented by Eric Hertz as a means to determine the proper tuning of the ultrasonic gun. During this test, both Allen Hertz and Eric Hertz recognized in addition to the cleaning and heat, the ultrasonic energy causes the water within the cup to atomize and evaporate. These experiments were completed at Hepco, in San Jose, CA.

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- Further developments continued testing cleaning and drying on Electronic Assemblies using both water and alcohol.
- Experiments for applying ultrasonic energy for both print release and solder stencil cleaning / drying were completed at the MPM facility in Franklin Park, MA in September, 1998 and again in December, 1998. (See Nauas correspondence dated Oct. 26, 1998 Exhibit E)
- Addition of In-Line Cleaning systems to concept at NEPCON in Anaheim, CA, February, 1999.
- Experiments completed at DEK, Flemington, NJ in February, 1999 (See partially completed NDA dated January 21, 1999 - Exhibit F)
- Experiments completed at Heller in Florham Park, New Jersey in February, 1999.
- Further experiments were completed at Branson's facility in Danbury CT, in May of 1999. (See Branson / Galahad NDA - Exhibit G)
- Details of the various concepts were generated throughout the timeline by all three inventors (Allen Hertz, Eric Hertz, and Dennis Epp)
- Provisional Application Ser. No. 60/145,524 Filed July 24, 1999.
- Utility Application: The utility patent application, Ser. No. 09/621,249 was filed on July 21, 2000, claiming priority to the provisional application, Ser. No. 60/145,524.

The foregoing instrument was acknowledged before me on this 04 day of June, 2003

  
Allen Hertz  
June 04, 2003  
Date

  
Notary  
6/4/2003  
Date



Debra L. Seilf  
Commission # DD134096  
Expires July 15, 2006  
Bonded Through  
Atlantic Bonding Co., Inc.